HEALTH BUILDING NOTE 48

MC0157

Telephone Services

DEPARTMENT OF HEALTH
and the WELSH OFFICE

Health Building Notes

Health Building Notes (HBNs) are intended to assist those involved in the briefing and design stages of schemes to provide new health buildings or to adapt or extend existing premises. The Notes contain information on relevant aspects of service objectives, functional requirements, and design. They establish standards of accommodation that are consistent with the functional requirements and form the basis for deriving Cost Allowances.

The functions, activities, equipment, environmental conditions, engineering services and dimensions which are critical to the efficient performance of an activity are identified and discussed but no preference for any particular configuration or plan is implied. Optional solutions with cost implications are indicated, where appropriate, leaving local planners to make their own choices.

Reference is made in the Notes to the related Design Briefing System and also to Activity Data sheets which provide the detailed user requirements for each room or space.

Guidance on spaces common to all health buildings is presented in the four volumes which comprise HBN 40 'Common Activity Spaces'.

HBNs are prepared in consultation with representatives of the National Health Service and appropriate professional bodies.

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1 Scope of Health Building Note

1.1 This Health Building Note (HBN) provides guidance on telephone services and telephone systems. It contains information on the facilities offered by modern electronic equipment and data for determining the capacity of telephone exchanges. It also describes the accommodation required for telephone exchange equipment and operators' rooms. The guidance is relevant to the planning of new systems as well as to the rationalisation and upgrading of existing services.

1.2 It replaces the relevant parts of Hospital Building Note 18, Administrative Department, issued in April 1963, and reprinted with amendments in 1966.

Inclusions

1.3 The guidance given is primarily concerned with the provision of telephone services at a District General Hospital (DGH). It deals not only with the initial provision of a system for a new site, but also with the factors that should be taken into account when replacing an existing system on an established site. Systems within the range 200–1600 extensions are covered. For systems outside of this range, this HBN will still provide general guidance but the cost allowances and space information will not be appropriate.

1.4 Factors which may affect the capacity of the exchange and consequent accommodation requirements are also covered. These include the requirements for telephone network services to other hospitals and the handling of calls for remote or peripheral hospitals and other health care buildings.

1.5 Planning teams should co-opt appropriate professional advice at the earliest possible stage when planning a new telephone service or rationalising and upgrading an existing service. When planning teams discuss and define their project requirements with telecommunication engineers they will inevitably encounter specialised technical terms which they will need to understand. This HBN introduces and explains such terms and their related commonly used abbreviations at the appropriate points in the text.

Exclusions

1.6 Technical guidance which is more appropriate to those concerned with the detailed design, specification, procurement and commissioning of telecommunications networks and exchange equipment is excluded. Basic technical information concerning the different types of telephone exchange equipment and their facilities is given in "An Introduction to Telephone Systems" published by the Institute of Hospital Engineering. Technical information on the features of electronic telephone exchange equipment is also included in the explanatory notes within NHS Model Specification C47. (See paragraph 6.4.)

1.7 This HBN does not provide guidance for the technical specification of ancillary communications services, eg staff paging, radio, and data transmission.

Design Briefing System (DBS)

1.8 The DBS is a series of notebooks which are used in conjunction with new or revised building notes to help specify user requirements for a Design Brief. Each notebook adopts a check-list approach, providing a framework which guides the project team through the consideration of organisational and planning options, and leads to a list of activity spaces. Although the application of DBS is confined mainly to planning new facilities, it can be used also to prepare a brief for extensive upgrading of existing accommodation. Health Building Notes published by HMSO are accompanied by the relevant DBS Notebook. Further information about DBS can be obtained from the Department of Health, Room 503, Euston Tower, 286 Euston Road, London NW1 3DN (tel: 01 388 1188 ext 3590).

Capricode

1.9 Capricode is the mandatory procedural framework governing the inception, planning, processing and control of individual health building schemes. The aim of Capricode is to promote a consistent and streamlined approach to capital development that achieves best use of resources through the selection and construction of relevant and cost effective schemes that are completed on time and within budget. It identifies the main activities and provides a framework for delegation with effective management and the proper accounting for expenditure and performance. (See "Capricode Health Building Procedures" issued to Health Authorities with HN(86)62 – in Wales, WHC(86)62).

Cost Allowances

1.10 The Cost Allowances associated with this HBN are promulgated in an annex to the Health Notice HN(89)15. The areas in the Schedule of Activity Spaces in Chapter 7 are those used in preparing the Cost Allowances. They may be used as a guide in preliminary planning, but must under no circumstances be treated as a maximum or as an entitlement. This is dealt with more fully in Chapter 7.

Works Guidance Index

1.11 This Note contains guidance that is current at the time of publication. Specific issues such as arrangements for dealing with fire, security, and energy conservation, are covered by other published guidance which must also be taken into account. Some aspects of the guidance in this Note may from time to time be amended or qualified and it is necessary for project teams to check with the current edition of the Works Guidance Index. The Index is published by the Department in May each year and updated in September and January. It should be noted that as the Index published in May covers the guidance current in the previous year, it carries the previous year's date, as do the two updates.

2 General Service Considerations

General telephone system considerations

2.1 This chapter considers the general matters which should be taken into account in the provision of a telephone service. The planning of a new installation, or the replacement of an existing large telephone exchange, should never be carried out in isolation from other locally related factors. A review of service requirements for the District and the overall strategy for telephone facilities within the District are fundamental issues in determining the level of provision that is appropriate for a particular site.

2.2 Particular consideration should be given to:

a. all communication requirements at the hospital site, with a view to integrating telephones with other systems, eg staff paging;

b. a review of the effect that the provision of a new exchange may have on the telephone service to and within adjacent health care buildings;

c. the provision for making calls to the external emergency services (ie fire, police and ambulance); HTM 82 gives specific recommendations to ensure reliable contacts with the local fire brigade;

d. the possibility of using the exchange as a tandem exchange, ie allowing extension users on linked and satellite exchanges to extend calls through the main exchange to other remote or peripheral exchanges;

e. the possibility of providing at a major site, operator facilities and services for smaller off-site peripheral health care buildings with a view to achieving revenue savings;

f. any future requirements for data transmission or remote call logging and related space implications;

g. better utilisation of any existing inter-switchboard circuits or private lines, eg possibly by forming a network based on the main telephone exchange.

Liaison with public telephone operator

2.3 At an early stage, the public telephone operator (PTO)* should be informed of the intention to provide a new exchange. This is especially important in the 'greenfield site' situation where the new requirements may necessitate an extension of the local network.

* predominantly British Telecom, but other agencies, eg Mercury Telecom, may be involved in a specific project.

Impact of electronic telephone exchanges on existing systems

2.4 The transition from exchanges of the electro-mechanical (Strowger) type to electronic exchanges using solid state switching and Stored Program Control (SPC) has been relatively swift. Apart from making the technology of electro-mechanical exchanges obsolete, the electronic exchange offers many more facilities together with space and revenue savings. Maintenance of electro-mechanical exchanges is labour intensive and costly, and spares are now increasingly difficult to obtain and expensive. This, together with user demand for the more sophisticated facilities, has accelerated changeover to electronic exchanges. Before any decision is taken regarding the replacement of an existing exchange, an investment appraisal of the options should be undertaken to establish costs and benefits and the timing of the replacement programme.

2.5 It should be noted that the anticipated life of an SPC exchange is 10 to 12 years compared with 18 to 20 years previously expected from electro-mechanical exchanges.

SPC exchange facilities

2.6 The SPC exchange is basically an electronic processor controlled by software. The program can be altered within defined limits to cater for changes in service requirements which may take place in time. Standard software packages provide a significant number of facilities for user extensions and operators, but not all of these will be needed in health care buildings. Some will have capital as well as revenue cost implications and the selection of an appropriate range of facilities will need to be made very carefully.

2.7 The selection of facilities is usually made by a "three-level" process:

a. While the trend is towards equipment manufacturers offering a common and comprehensive software program, it is still possible to elect for a simpler program with a limited number of facilities. Further facilities may be optional and may involve the purchase of another, more expensive, program;

b. Within the program selected, it is possible not to invoke any facilities which are considered to be inappropriate;

c. The facilities which are invoked can then be awarded or denied to the extensions as required. Alterations to the facilities available at a particular extension can be readily made (by the system supervisor) to meet changing needs.

2.8 Some of the facilities offered by SPC exchanges and commonly used in health care buildings are:

a. making and receiving internal calls;

b. receiving external calls;

c. graded access for making external calls via the Public Switched Telephone Network (PSTN);

d. call barring to selected external numbers;

e. abbreviated dialling of frequently used numbers;

f. coded ringing to differentiate internal from external calls;

g. conference calls for simultaneous conversation between a maximum of six extensions;

h. temporary call diversion to an alternative extension number selected by user;

j. call transfer by an extension user to another extension;

k. night service arrangements.

Other facilities are available, but these are only rarely appropriate for health care buildings. Comprehensive details are given in Model Standard Specification C47 (see paragraph 6.4).

Calls to emergency services

2.9 Calls made within the hospital to the emergency services, and the manner in which they are dealt with, are important considerations which should be resolved at the planning stage. Operational policies should encompass all emergency calls — those of a clinical nature, as well as those relating to fire and other critical alarms. The telephone number for emergency services should be easy to remember and easy to dial. Staff moving from one location to another will not be confused if health care premises use the same number, but this may not be practical in every case. The preferred number to call is 222, or 2222, as appropriate.

2.10 All circuits used for emergency calls should terminate at either the operators' consoles or on separate handsets in the telephone operators' room. (See also paragraph 4.16.) All emergency circuits should have a distinctive ringing tone and should be protected by "non-busy" exchange equipment to ensure that all emergency calls are connected.

User input to SPC exchange programming

2.11 The software program for SPC exchanges is configured to the user's requirements on the basis indicated in paragraph 2.8. This will usually necessitate considerable consultation with users, and can be a lengthy task for a large health care building. Currently, this work is part of the pre-delivery process and may affect the delivery of the exchange.

2.12 The supplier of the exchange usually assists in the compilation of user requirements. However, some preparatory work may be done in anticipation, as many of the facilities are common to several suppliers of exchanges. This would help to reduce the time taken for final completion of software and delivery of the exchange.

Paging

2.13 It is current practice to couple the paging systems with the telephone exchange. This allows extension users to access the paging system and transmit paging calls without involving the telephone operator.

2.14 Modern digital paging receivers provide visual indication of the extension originating the page and the paged party simply calls this number.

2.15 The interface between the paging system and the telephone exchange should allow for a minimum of two calls to be handled simultaneously.

Call Information Logging Equipment (CILE)

2.16 This equipment, of which there are many varying types, is not essential to the operation of an SPC exchange, but it can provide useful information to enable a system to be utilised efficiently. It can also be used to monitor traffic from individual, or groups of, extensions and provide detailed costing information to assist managers to control their telephone budgets.

2.17 Suitable terminations (ie a V24 access port) and relevant software will normally be provided on the SPC exchange to allow CILE to be easily connected.

2.18 Depending upon the type of exchange and software, it is desirable for CILE to provide, as a minimum, the following information:

a. duration and cost of calls;

b. percentage usage of exchange lines;

c. departmental summaries;

d. private line usage;

e. designated number reports;

f. busy and quiet extensions;

g. usage of individual extensions;

h. numbers dialled frequently;

j. histogram reports, eg exchange utilisation, operator time to answer;

k. selective printing of all reports.

2.19 Care should be taken to select adequately sized equipment incorporating data memory capacity appropriate for the total number of extensions and the traffic being generated.

Directory package

2.20 This may be available as part of CILE or as a separate system. It is primarily for the telephone operators use but can normally provide the information required for a site telephone directory when printed.

2.21 Directory packages may typically provide the following facilities:

a. Two levels of password access —
   Level 1 — for directory enquiry;
   Level 2 — for data base changes;

b. Two directory data bases. Enquiries are made on the current directory, but changes are made on the up-date directory;

c. Choice of directory enquiry under —
   (i) surname;
   (ii) department;
   (iii) subject;
   (iv) extension number;
   (v) location;

d. The Directory package will normally allow "Information pages" to be created. This will permit instructions to be stored for incident action, eg Fire Alarm or Call-out procedures.

Telephone system management

2.22 Adequate management and supervision of the telephone system is necessary to ensure that it operates at maximum efficiency and keeps pace with the changing requirements of the hospital.

2.23 The initial allocation of extension user facilities will require alteration and updating as needs change. While this work may be done by the telephone supervisor, it should be approved by management and an updated list of facilities in use should be maintained. Similarly, if CILE or a Directory Package is provided, proper management and supervision will be necessary.

2.24 The extensive list of facilities available to the extension user would imply that the extension user must be given adequate training if the system is to be used effectively. Recommendations for staff training are described in Appendix 1.

3 General Functional and Design Requirements

3.1 This chapter describes the general functional requirements of a telephone service and outlines the accommodation required to satisfy the general service considerations decribed in Chapter 2.

Exchange equipment room

3.2 This room houses all necessary telephone switching and power supply equipment, the telephone wiring frames and termination boxes. It may also be required to house any Data Switching and CILE equipment. It should be equipped with a desk or worktop.

3.3 It is desirable, but not essential, for this room to be situated on the ground floor, to facilitate good access for heavy equipment.

3.4 It is important that surface finishes in this room are of a non-dusting, easily cleanable nature and of a type which dissipates static electricity. Silicon based cleaning methods must not be used on PVC surfaces.

3.5 Details of anticipated equipment weights are given in paragraph 4.3 and details of approximate room dimensions are given in paragraph 4.4.

Telephone operators suite

3.6 A self-contained suite consisting of the operators' room, staff rest room and WC is required.

3.7 The security of this suite is an important consideration, as most telephone exchanges are continuously manned (see paragraph 5.9). The 24 hour operational nature of this department makes it a useful area for terminating hospital alarm systems.

3.8 The operators' room should be at least of the same standard as hospital office accommodation, with an element of natural daylight and natural ventilation wherever possible. The avoidance of glare is an important consideration as consoles with electronic displays, and possibly VDUs, will be in use. Appropriate wall space for alarm panels and desk space for VDU monitors will be needed if these are to be accommodated within this space. If the room is carpeted, this should be of a type which dissipates static electricity.

Location of exchange

New site

3.9 The provision of accommodation in a new hospital does not present special problems. When the capacity of the exchange has been resolved, space requirements can readily be determined and planned within the building envelope.

3.10 It is preferable, for maintenance purposes, to have the exchange equipment room and the operators' room as close together as practicable but this is not essential for any technical reason.

Existing site

3.11 The accommodation of new equipment may present a particular problem in any replacement programme because the existing installation usually has to remain in use until the new exchange is brought into service. Each situation requires to be considered on its merits and the various options examined. The restraints which may be imposed by existing internal distribution cables are discussed more fully in paragraph 4.23.

Assessment of exchange capacity

3.12 The capacity of the proposed exchange needs to be assesed at an early stage in the planning of a new or replacement system.

3.13 If an exchange is being provided on a new site, an estimate of the number of extensions may be made by comparison with a similar hospital or by applying the following telephone extension/bed ratios:

Type of hospital	*Telephone extension/bed ratio*
Major teaching	1.70
DGH	1.40
General (Acute)	1.34
Maternity	0.60
Long stay	0.45

3.14 Some types of exchange equipment have a finite capacity and cannot be extended. Care should be exercised in selecting exchange equipment as this factor could be a constraint in future development.

3.15 Where an exchange is being replaced, the existing level of provision should not be assumed to be adequate, and a re-assessment of extensions and exchange lines should be made. The ratios suggested in paragraph 3.13 may be applied as a first check on the adequacy of the system. In many cases, a demand for further extensions may have been suppressed because of the lack of exchange capacity. Typical indications of this situation are:

a. a large number of shared extensions;

b. a waiting list for further extensions;

c. a number of small exchange systems with separate exchange lines;

d. a number of Direct Exchange Lines (DEL).

A temporary monitoring exercise using CILE may provide useful information at this stage.

Exchange lines

3.16 Several different types of exchange lines (also known as 'trunk circuits' or 'trunks') are available and their relevant features are described in the following paragraphs.

3.17 Standard Exchange Lines are graded into three types:

a. Incoming only — which accept incoming calls and are answered by the operator;

b. Outgoing only — for outgoing calls made either by direct (level 9) access from an extension or via the operator;

c. Bothway — which are suitable for a. and b. above.

It is recommended that any installation should contain a mixture of all types in the approximate proportions 1:1:2 respectively, and the total number of standard lines provided should be equivalent to approximately 10% of the extension capacity of the exchange.

3.18 Direct Inward Access (DIA) lines can be provided by a feature incorporated in the exchange equipment which enables standard exchange lines to be routed direct to an individual extension, bypassing the operator. It is recommended that this facility should be limited to defined and specialised functions, eg out-patients appointments and bed booking.

3.19 Direct Dialling Inward (DDI) Lines are a separate block of lines, over and above those described in paragraph 3.17, intended to provide an inward dialling arrangement which bypasses the operator and enables callers to access a pre-determined range of extensions. They are normally provided on a basis of one exchange line per twenty DDI extensions, but their provision needs to be considered carefully. DDI can reduce the operators workload provided adequate advertisement of numbers has been carried out, but considerable extra capital and revenue cost is involved and the facility must be fully utilised in order to justify its provision. Not all public telephone systems can offer this facility and the PTO must be consulted if it is desired to have DDI lines.

3.20 Until recently, exchange lines have used analogue signalling, but the availability of digital signalling has increased, and this should be utilised where it is available. It is important that equipment suppliers are aware of the type of signalling to be used.

"Out-of-area" Exchange lines

3.21 Where a hospital has a considerable volume of telephone traffic to an adjacent Public Telephone Area which would normally be charged at trunk call rates, it is possible to provide Exchange lines from that Telephone Area as well as from the Telephone Area normally serving the hospital's location. This would enable calls to be made at local rates, but such an arrangement should be justified economically for any specific project.

Fall Back (Drop Back) of exchange lines

3.22 This is the situation that occurs in the event of a total exchange failure (or 'crash') whereby the exchange lines are diverted directly to specific extensions or to a small emergency manual switchboard, to enable minimal communication to take place.

3.23 It is recommended that at least 20% of standard exchange lines, and not less than 16 lines, are diverted in this manner. This may not be adequate for all situations and project teams will need to consider this recommendation in the contect of their own operational policies.

3.24 The specific extension instruments providing fall-back must be compatible with the type of signalling used on the exchange lines.

Private circuits

3.25 Where there is considerable telephone traffic between geographically separated sites, it may be more economic to provide a private circuit between the respective switchboards rather than pay for individual calls made via the PSTN. Such private circuits are installed by, and usually rented from, the PTO.

3.26 Private circuits are also known as tie lines, private lines, interswitchboard circuits, access lines (a British Telecom term) and sometimes by other local descriptions.

3.27 It should be noted that multi-channel private circuits can be made available by the PTO if the amount of telephone traffic warrants this provision.

Call barring (Route restriction)

3.28 SPC telephone exchanges can be programmed to control the access from any individual extension to the public networks, whether local, STD or international. They can also be programmed to bar access to specified numbers.

3.29 Outgoing calls made from barred extensions have to be routed via the operator, and this will increase the operator's workload. If barring is extensive, the services of an additional operator may be needed. This will erode potential savings from call-barring.

3.30 In operational terms, a series of bands may be used to define the level of access available from extensions. Bands may be graded in ascending order of access as follows:

a. Level 1 — Operator and private lines;

b. Level 2 — Level 1, plus local access but excluding specified numbers;

c. Level 3 — Level 2, plus STD access but excluding specific numbers.

3.31 Normally, the level available at any particular extension can be easily changed by the supervisor or systems manager.

Hand sets

3.32 Ideally, telephone hand sets should be purchased outright as part of the telephone exchange contract. This will ensure that the hand sets are technically compatible with the exchange. Particular care must be taken in this respect if nationally negotiated bulk supply contracts are used to purchase additional hand sets for an existing SPC exchange. Where hand sets are purchased centrally for use with a new exchange the exchange installer should be contracted to accept, install and test the hand sets as part of the complete system.

3.33 As a general guide, hand sets should be of a standard pattern and colour to simplify replacement.

3.34 Most modern telephone hand sets are supressed against radio frequency interference in accordance with the requirements of NHS Model Specification C 47 (see paragraph 6.4). However, certain hospital departments, eg physiotheraphy/rehabilitation, utilise medical equipment which emits very high levels of radio frequency radiation and care must be taken to select hand sets for these areas which are not unduly affected by the local high levels of radio frequency interference.

3.35 It is not usually cost effective to repair damaged or defective hand sets because of the price advantage gained from bulk purchasing.It is recommended therefore that 5% additional hand sets should be ordered as spares when the contract is placed and used as replacements for damaged or defective hand sets.

Payphones

3.36 It is usual to make some provision, at suitable convenient locations, which will allow patients, visitors and staff to make prepaid telephone calls via the public network.

3.37 Payphones may be either fixed (eg in waiting areas in the main entrance and/or in the Accident and Emergency Department and Out-Patients Department), or mobile, in the form of a plug-in transportable trolley (eg for use in in-patient wards). Other HBNs give guidance on individual hospital departments requirements, but the total level of provision is a matter for local policy.

3.38 To assist patients with impaired hearing, the hand set of payphones should be fitted with an inductive coupler suitable for use with a hearing aid. In addition, consideration should be given to mounting at least one payphone at a height suitable for a person in a wheelchair.

3.39 All payphones should be connected to separate exchange lines, and not routed via the hospital switchboard. They should have their mode of operation restricted to making outgoing calls only. In order to economise on the number of exchange lines allocated to this facility, the terminations (line jack units) in the areas served by a particular trolley phone should be connected to a single exchange line.

3.40 Coin operated payphones will usually be the most convenient for all users, but it is a matter for local policy as to whether prepaid phonecard payphones should be provided. If payphones are restricted solely to the phonecard type, consideration should be given to the availability of phone cards. There may be administrative implications associated with the stocking, security, and sale of these within the hospital.

Telephones in lifts

3.41 It is common practice to provide a telephone inside lift cars, for emergency use, connected to the local telephone system. Where these are provided in lifts to which patients and visitors have free access, the telephone hand set should be fitted with an inductive coupler suitable for use with a hearing aid. Co-ordination with the lift supplier will be required to ensure that a telephone box with sufficient space to accommodate this type of hand set is provided in the lift car construction.

Intercommunication systems

3.42 A properly planned SPC exchange will provide prompt intercommunication facilities between all extensions. Abbreviated dialling can be used for a range of frequently called extension numbers. Consequently, the provision of separate intercommunication systems should be actively and strongly discouraged.

3.43 Self-contained intercom systems are relatively inflexible and limited in the extent of their economic application. Any subsequent modifications to them usually involve disproportionate cost. In only very rare instances can such systems be justified for functional or clinical reasons.

4 Specific Functional and Design Requirements

4.1 This chapter describes the accommodation and engineering services required for a telephone system. However it must be stressed that the information given is for general planning purposes. The precise requirements and equipment configurations of a particular manufacturer must be ascertained as these may vary from the information given in this Chapter.

Equipment room

4.2 The number of exchange equipment cabinets to be accommodated within the equipment room will be determined by the size of the exchange and may be assessed on the following basis:

Typical Maximum numbers	*1 cabinet*	*2 cabinets*	*3 cabinets*
of extensions	400	1,000	1,600
of trunks	50	120	300

4.3 The following table indicates the weight of equipment:

	1 cabinet	*2 cabinets*	*3 cabinets*
Weight of exchange equipment, including cabinets	220 kg	440 kg	660 kg
Weight of termination frames (TJF)	50 kg	50 kg	50 kg
Weight of battery cabinets, (assuming 4 hour) battery back-up)	440 kg	880 kg	1,100 kg
Weight of cable cabinet	140 kg	140 kg	140 kg

4.4 The following table indicates typical room dimensions which will house the equipment scheduled in paragraph 4.3:

1 cabinet	*2 cabinets*	*3 cabinets*
4.5m×3.5m	4.5m×4.5m	4.5m×5.5m

Normally, these sizes will provide sufficient space for CILE. If any other equipment not directly concerned with the telephone service is installed in this room (eg data switching apparatus), extra space will be necessary.

Environmental conditions in equipment rooms

4.5 Overheating or high humidity in equipment rooms are the most common factors which cause an SPC exchange to perform erratically, or at worst, "crash" completely.

4.6 Typically, equipment rooms will need to be maintained within a temperature range of 10°C to 30°C with relative humidity ranging from 30% to 65% but the actual manufacturer's requirements should be confirmed.

4.7 Mechanical ventilation will usually be sufficient to prevent unacceptable overheating for most of the year, but, depending on local circumstances, some cooling is likely to be necessary during the summer months.

4.8 Typical heat output from equipment is:

1 cabinet	*2 cabinets*	*3 cabinets*
3.5 kw	4.5 kw	5.5 kw

Actual figures should always be confirmed with the equipment supplier.

Electrical services for equipment rooms

4.9 The electrical requirements of SPC exchanges are generally not onerous but do vary considerably from one manufacturer to another. In the majority of hospitals the electrical supply will be taken from the essential circuits and this should be taken into account when deciding on battery back-up capacity.

4.10 In the unusual event of an exchange being served without batteries and rectifying equipment, consideration should be given to the provision of mains conditioning equipment because SPC exchanges are susceptible to voltage fluctuations.

4.11 A 40 amp capacity single phase supply is usually adequate, but different manufacturers require this service terminated in varying ways, eg a consumer control unit, two 20 amp isolators, a single 40 amp isolator. Some manufacturers may arrange their equipment for a three phase supply.

4.12 A good earth connection is required. This should comply with the functional earth requirements of BS 6701:Part 1 (see Bibliography).

"Wet" services

4.13 As a general principle, "wet" services should not be installed in, or routed through, equipment rooms. Exceptionally, where this is unavoidable, there should be no joints in any pipework within the equipment room. If "wet" services in existing accommodation cannot be removed or diverted, special drip trays with suitable drainage connections should be provided.

Operators' room

4.14 The following table provides guidance on the number of operating positions and space requirements:

	1 cabinet	*2 cabinets*	*3 cabinets*
Typical number of operating positions	2	5	8
Area of room	10 sq.m	25 sq.m	40 sq.m

4.15 If this room houses extra equipment (eg Paging Encoders, Call Logging Information Equipment, Alarm Panels), or provides reception or clerical facilities, extra space may be needed.

4.16 A telephone, separate from the operators' consoles, should be provided for use by the staff. This should be in addition to any hand sets for receiving emergency calls (see paragraph 2.9).

Staff facilities

4.17 A rest room communicating directly with the operators' room should be provided. There should be seating for at least two persons or up to about half the number of operating positions. Simple facilities for the preparation of snacks and beverages are required, including a sink, small refrigerator, and storage facilities.

4.18 An adjacent WC, including a wash hand basin, is required. Planning teams should determine locally whether this WC should be suitable for a person in a wheelchair.

4.19 Staff lockers for the secure storage of personal belongings, and facilities for changing wet clothes, will be required in the rest room if central facilities are not conveniently located.

Telephone internal cabling distribution (ICD)

Conduit and trunking

4.20 The conduit and trunking for the telephone internal cabling distribution (ICD) is normally installed by the electrical sub-contractor during the construction of the building. Conduit is run to each telephone extension point and terminates in a standard conduit box.

Telephone ICD wiring

4.21 The telephone ICD wiring should be installed in accordance with Parts 1 and 2 of BS 6701 (see Bibliography) and a certificate to this effect must be issued by the installation contractor. This wiring should be connected to a standard Line Jack Unit (LJU) mounted on the conduit box at each telephone extension point. Connections at the other end will be in accordance with paragraph 4.25.

4.22 The telephone ICD wiring need not be part of the contract for the supply and installation of the telephone exchange. In some cases it will be necessary for this wiring to be installed in accordance with the main building contractor's programme of work. It may be provided by either the electrical sub-contractor or another specialist wiring sub-contractor.

4.23 When an existing installation is being upgraded, the customer may wish to purchase the ICD wiring, if this is being rented from British Telecom. In exercising this right, due consideration must be given to the age and condition of the installation. A Pre-Connection Inspection (PCI) will indicate what upgrading is necessary before it can be connected to the new exchange. If the ICD contains circuits which are part of the PTO's network services, the installation of an independent overlay system for these will be necessary.

Telephone wiring termination arrangements

4.24 On existing sites, it is normal for all telephone wiring (both extensions and network services) to be terminated at a Main Distribution Frame (MDF). If, in the upgrading of the installation, ICD wiring is being re-used, the MDF will be connected by interlinking cable(s) to a Test Jack Frame (TJF), which forms part of the new exchange equipment. The siting of the MDF is an important factor. Removal from its existing location may necessitate the complete rewiring of the site.

4.25 Installations on new sites or on existing sites that are to be completely rewired, normally fall into two categories —

EITHER:

a. Those where the telephone ICD wiring is to be carried out at the same time as the exchange is installed.

   In this instance, the PTO will terminate his services at a Network Termination Point (NTP) and then extend them to the TJF. The exchange contractor, or his installation sub-contractor, will be responsible for finally connecting the telephone ICD wiring to the TJF.

OR:

b. Those where the telephone ICD wiring is to be carried out in advance of the exchange installation.

   In this instance, the telephone ICD wiring would be terminated at a Building Distribution Frame (BDF), and the PTO would initially terminate his services at a NTP. The exchange contractor should be made responsible for linking the BDF to the TJF and for accepting and commissioning the telephone ICD wiring as an integral part of the complete telephone system. The PTO would be responsible for eventually extending his services from the NTP to the TJF.

5 Other General Functional and Design Requirements

5.1 This chapter contains additional guidance concerning aspects of function and design which are common to health buildings generally. They will need to be borne in mind when providing a new telephone service and when upgrading or replacing existing systems and accommodation.

Statutory and other requirements

5.2 Health Circular HC(88)60 (in Wales, WHC(89)20) advises health authorities that their building schemes should comply with the requirements of building legislation, even where these are not legally enforceable against authorities, and with all other relevant codes of practice and standards. It also requires authorities to ensure that they have adequate procedures to ensure compliance. Attention is also drawn to HC(86)14 (in Wales, WHC(87)7), concerning Food Hygiene and Pest Control in the Health Service, and to HC(87)3 (in Wales, WHC(87)8) concerning Health and Safety at Work: Crown Immunity. These give the practical implications of the change in the law on Crown Immunity. This Note takes account as far as possible of all statutory and other requirements currently in force, but health authorities are reminded of their responsibility for ensuring compliance with statutes, regulations, codes and standards.

Disabled people

5.3 It is essential to ensure that suitable access and facilities are provided for disabled telephone operating staff who have problems of mobility or orientation. This includes, besides the wheelchair bound, those who for any reason have difficulty in walking and those with a sensory handicap such as a visual impairment. Authorities are reminded of the need to comply with the provisions of the Chronically Sick and Disabled Persons Act 1970, as amended by the Chronically Sick and Disabled Persons (Amendment) Act 1976, the Disabled Persons Act 1981, and the Building (Disabled People) Regulations 1987. Attention is also drawn to BS 5810:1979 "Access for the Disabled to Buildings" (under review). One of the effects of the 1981 Act is to apply this British Standard to premises covered by the 1970 Act, which includes those open to the public. Practical guidance for complying with the Building (Disabled People) Regulations issued by the Department of the Environment under Approved Document M: 'Access for the Disabled'.

Fire precautions

5.4 It is essential that project teams familiarise themselves with the guidance in the FIRECODE series of documents which together give the Department's policy and technical guidance on fire precautions in hospitals and other NHS premises. In particular, the need for structural fire precautions and means of escape from the whole accommodation must be taken into account at the earliest possible planning stage. The key document for these aspects in hospitals is 'FIRECODE: Fire precautions in new hospitals', Health Technical Memorandum 81.

5.5 In addition, basic policy, principals and key management guidance are contained in 'FIRECODE: Policy and principles'. Other FIRECODE documents include Health Technical Memorandum '80' series (which give technical guidance on various building, engineering and equipment issues) and Nucleus guidance. Existing HTMs will in due course, be reissued in FIRECODE format. The series includes 'FIRECODE: Directory of Fire Documents' which lists references to relevant legislation and relevant fire precautions guidance issued by DH and other sources, for example, the Home Office.

5.6 FIRECODE and publications in the HTM '80' series are listed in the Bibliography at the end of this Note.

5.7 It is important to establish during the design stage those aspects of fire safety strategy which affect the design, configuration and structure of a project. At appropriate stages of the design process, the architect and engineer should discuss and verify their proposals with the local fire authority, and ensure that the project team and all other planning staff are fully acquainted with the fire safety strategy for the design in terms of operation (staff responsibilities etc), equipment provision, and buildings and engineering layouts. Health Technical Memoranda 57, 58, 59 and 60 give detailed information for the selection of fire resisting components.

5.8 The principles of fire safety apply equally to new projects and to alterations and upgrading of existing buildings.

Security

5.9 Assaults on hospital staff and theft of NHS property are recognised problems. The project team should discuss security with the officer in charge of the local Police Crime Prevention Department and the hospital or district security officer or adviser at an early stage in the design of the building. Fire and Security

Officers should be consulted concurrently because the demands of security and fire safety may sometimes conflict. The attention of planners is drawn to Circular HN(84)26, dated December 1984 (in Wales Circular WHN(85)1) about Security, and the NHS Security Manual issued with the Circular.

Component Data

5.10 The Component Data Base (Mark 3) consists of a series of Health Technical Memoranda, (see Bibliography) which provide specification and design guidance on building components for health building which are not adequately covered by current British Standards.

5.11 The components (eg Internal doorsets and Windows) applicable to office accommodation should generally be suitable for the accommodation required for telephone services.

Smoking

5.12 Health Circular HC(85)22 — in Wales, WHC(85)31 — provides guidance about smoking on health premises. While recognising that the responsibility for determining local policies rests with the health authority, the circular recommends that smoking should be restricted as far as is practicable and, where it is permitted, confined to specially designated areas which are clearly signposted. In such areas ventilation should be sufficient to prevent discomfort to non-smokers and the spread of odours to other areas of the premises.

Upgrading or adaptation of existing buildings

5.13 The standards set out in this guidance essentially apply to the provision of accommodation by new building and it is not intended that they should be applied retrospectively to existing stock. However, the principles are equally valid and should be applied, so far as is reasonably practicable, when existing accommodation is being upgraded or new accommodation is being constructed within an existing building, which may previously have been used for other purposes.

5.14 Before any decision is made to carry out an upgrading project, consideration must be given to the long-term strategy for the service, the space required for the new service, and the size of the building. Regard must also be paid to the orientation and aspect of the building and the adequacy and location of all necessary support services.

5.15 If there emerges a prima facie case for upgrading, a thorough analysis of all functional and physical conditions of the existing building should be undertaken.

5.16 The check of physical and other aspects of existing buildings should include:

a. availability of space for alterations and additions;

b. type of construction;

c. insulation;

d. age of the buildings, condition of fabric eg external and internal walls, floors, roofs, doors and windows, which may be determined by a condition survey;

e. life expectancy and adequacy of engineering services, ease of access and facility for installation of new wiring and pipework, if required;

f. the height of ceilings (high ceilings do not necessarily call for the installation of false ceilings, which are costly and often impair natural ventilation);

g. changes of floor levels to obviate hazards to disabled people;

h. fire precautions;

j. physical constraints to adaptation such as load-bearing walls and columns.

5.17 When comparing the cost of the upgrading or adapting an existing building to that of a new building, in addition to the building cost, due allowance must be made for the cost of relocating people, demolition, and salvage costs, disruption of services in a phased project, and the temporary effects on running costs of any impaired functioning of areas affected by upgrading.

5.18 The cost of upgrading work should conform to the guidelines indicated in the Department's WKO letter (81)4 — in Wales, AWO(81)8. Those guidelines take into consideration the estimated life of the existing building and the difference in cost between upgrading a building and new building.

5.19 Having decided that existing premises are suitable for upgrading or conversion, the main requirement will be to assess how best the accommodation can be planned so as to facilitate good working practices.

5.20 The main environmental factors which should be considered are the same as for new building.

5.21 Upgradings must conform to current fire safety and other statutory regulations. It is very difficult to estimate the fire resistance of floors, walls and doors of existing buildings.

5.22 This summary of the main aspects of upgrading is general in character and it is recognised that each upgrading project will present its own individual problems. In many instances compromises may have to be made between building note standards and what is possible to achieve. Upgradings should be functionally sound — not merely cosmetic — and appropriate for the projected needs for a number of years to come.

6 Engineering Services

6.1 This chapter describes the engineering services contained within the accommodation for a telephone service and their integration with the systems serving a whole site. Its purpose is not to inhibit the design solution but to acquaint the engineering members of the multi-disciplinary design team with the criteria adopted (in terms of material specification, design conditions and reference data) to meet the functional requirements.

6.2 The accommodation required for a telephone service is comparatively small and will be unlikely to exist as a self-contained department. It will usually be incorporated with other non-clinical, administrative accommodation on a hospital site. Therefore the engineering services for a telephone service will generally be provided by systems serving adjoining accommodation. It is not considered appropriate to repeat in this Chapter all the basic engineering criteria recommended for administrative accommodation and, therefore, the following paragraphs are confined to only those aspects which have to be considered specifically for telephone service accommodation.

6.3 Documents referred to by number, eg[2] are listed in the References at the end of this Chapter. They are numbered in order of first appearance, repeated references retaining the same number.

Model specifications

6.4 A series of model specifications for the specialised engineering services in health care buildings have been issued nationally and are sufficiently flexible to reflect local needs. The cost allowance for the engineering services in this accommodation is based on the qualities of material and workmanship described in the relevant parts of the model specifications. The cost allowance for the telephone exchange equipment is based on the requirements and guidance contained in NHS Model Specification C47.[1]

Noise

6.5 Excessive noise in the individual areas, whether internally or externally generated and transmitted, can adversely affect operational efficiency and can cause discomfort. The limits and means of control advocated in Hospital Design Note 4[2] including its revisions[3] and Engineering Data Sheet DH1[4] should provide an acceptable acoustic environment. Careful design of ventilation systems, especially those associated with the exchange equipment room, and the choice and location of appropriate finishes are required to ensure that an acceptable sound level is achieved in the telephone operators' room. Acceptable noise levels for the individual spaces are shown on the Activity Data "A" Sheets.

Space requirements for services

6.6 The satisfactory performance of plant in health care buildings is particularly important and the design should allow for ease and safe means of access and space for the necessary frequent inspection and maintenance and for eventual removal and replacement. As far as practicable, however, this access should be protected from unauthorised entry.

6.7 The distribution of mechanical and electrical services to final points of use should, wherever possible, be concealed in walls and above ceilings. Heat emitters should be contained within a 200mm wide perimeter zone under window sills and critical dimensions should be taken from the boundary of this zone. For costing purposes the 200mm zone, which includes the floor area occupied by minor vertical engineering ducts, is included in the building circulation provision.

Safety

6.8 Section 6 of the Health and Safety at Work etc Act 1974[5] as amended by Schedule 3 of the Consumer Protection Act 1987[6] imposes statutory duties on all persons who design, manufacture, supply, install or erect "articles for use at work". One of the requirements of this Section is to ensure, as far as is reasonably practicable, that the article is so designed and constructed that it will be safe and without risks to health at all times when it is being set, used, cleaned or maintained by a person at work. All parts of engineering systems are covered by the term "articles for use at work" and designers of these systems for health care premises must therefore fulfil their statutory obligations.

Fire safety

6.9 Design guidance for the fire safety requirements in new health buildings is given in HTM 81.[7] Technical information concerning the design and specification of fire detection and alarm systems is detailed in HTM 82,[8] which also replaces or modifies certain clauses of BS 5839 Part 1[9] to meet the needs of health care premises. More general advice on fire prevention, including the storage of flammable materials, is contained in HTM 83.[10]

6.10 The design of the engineering services should accord with the recommendations in the above series of HTMs and the engineer should verify his proposals in accordance with the procedure described in paragraph 5.7.

MECHANICAL SERVICES

6.11 The mechanical services include the provision of heating, ventilation, cooling and hot and cold water. For cost allowance purposes, the distribution of the heating and the hot and cold water systems is deemed to exist within adjoining accommodation and can be readily extended to serve the telephone services accommodation.

6.12 Reference should be made to the Activity Data sheets for environmental requirements in individual spaces. Recommended room temperatures, air change rates, hot water service temperature etc are grouped under "Technical Design Data" on each 'A' sheet. The 'B' sheets give the disposition of engineering outlets for the activities described.

Heating

6.13 Space heating requirements in the telephone operators' suite can be met by low pressure hot water radiators operating as part of the sub-system serving the adjoining accommodation. Consideration must be given to the 24 hour operational nature of this suite, particularly with regard to the sizing of radiators connected to sub-circuits which have temperature and night set-back compensation.

6.14 Radiators should normally be located under windows or against exposed walls. Sufficient clear space between the top of the radiator and the window sill should be provided to prevent curtains reducing the output and to provide adequate space below for cleaning machinery to be used. Where a radiator is located on an external wall, back insulation should be provided to reduce the rate of heat transmission through the building fabric.

6.15 The heat dissipation from the exchange equipment (see paragraph 4.8) will usually be more than sufficient to satisfy the space heating requirements of the exchange equipment room. Therefore only temporary heating need be provided, to ensure the minimum acceptable space heating temperature (see paragraph 4.6) during the initial installation and commissioning of this equipment.

Temperature controls

6.16 To facilitate temperature control thermostatic radiator valves should be installed. These valves should be of robust construction and selected to match the temperature and pressure characteristics of the heating system. The thermostatic head, incorporating a tamper-proof facility for presetting maximum and minimum room temperature, should be controlled via a sensor located integrally or remotely as appropriate.

Ventilation — general requirements

6.17 Recommendations for the ventilation of individual spaces are shown on Activity Data 'A' sheets.

6.18 Mechanical ventilation systems are expensive in terms of capital and running costs and planning solutions should be sought which take maximum advantage of natural ventilation.

6.19 Extract requirements can be provided either from a system serving adjacent accommodation or by a local unit.

Ventilation and cooling of exchange equipment room

6.20 The exchange equipment room will need to be mechanically ventilated because of the amount of heat dissipated by equipment. For most of the year, mechanical ventilation will normally be sufficient to prevent overheating and to maintain space temperatures within the operating limits of the equipment. Some cooling may be necessary in summer; this will depend on location and other factors. Paragraph 4.6 deals with environmental conditions and paragraph 4.8 gives some indication of heat output from equipment.

6.21 The requirements can be satisfied by a local self-contained "packaged" ventilation and air cooling unit. It should include enthalpy control features to make use of 100% fresh air for cooling when it is appropriate to do so. Alternatively, the requirements may be met from a system which is in operation continuously and is supplying air at a suitable condition to other adjacent spaces.

Hot and cold water services

6.22 The domestic hot and cold water supply should be taken from the systems serving the adjacent accommodation.

ELECTRICAL SERVICES

6.23 The electrical installation will include wiring and equipment for lighting and power, together with the earth bonding of extraneous metalwork. Extensions from the hospital central systems for clocks, fire alarms and staff location services will also be required. These installations should comply in all respects with the current Regulations for Electrical Installations[11] and conform to the requirements of HTM 7.[12]

6.24 Reference should be made to the Activity Data sheets for the recommended levels of internal illumination, disposition of outlets for power, telephones, call systems, and clocks etc in individual spaces. Power supplies for exchange equipment should be taken via sub-mains cable(s) from the nearest switch room. Final sub-circuits for lighting and small power should be taken from the essential distribution board serving adjacent accommodation, or alternatively, from a consumer unit within the equipment room.

6.25 The electrical installation in occupied areas should be concealed, usually using PVC insulated cable in screwed steel conduit or trunking, but, in certain circumstances, mineral insulated copper sheathed cables may be necessary.

6.26. Steel conduit and trunking wiring ways for the telephone ICD wiring should also be concealed whenever possible.

Electrical interference

6.27 Guidance concerning the avoidance and abatement of electrical interference is given in HTM 14[13] and fluorescent luminaires (lighting fittings) should comply with BS 5394.[14]

6.28 Care should be taken to avoid mains borne radio frequency interference affecting electro-medical equipment used elsewhere in the hospital. See paragraph 3.34 regarding the effects of radio frequency interference on telephone hand-sets.

Lighting

6.29 Practical methods of lighting the various functional spaces are contained in the CIBSE Lighting Guide[15]. The choice of luminaire should take account not only of the requirement for light distribution and visual comfort appropriate to the space, but also the operational efficiency of the light source used. Luminaires should be of a type which are easily cleaned and maintained, as well as being manufactured and tested in accordance with the requirements specified in the relevant sections of BS 4533[16]. Their location should be readily accessible for lamp changing and maintenance, but with the overriding requirement that the recommended standard of illuminance is provided to task areas. Luminaires using fluorescent lamps should be installed when artificial lighting is required for long periods or where areas are devoid of natural light; intermittently used luminaires may be fitted with compact fluorescent lamps.

6.30 Control of lighting is normally by local switches and these should be provided in sufficient numbers to allow variation in lighting options eg reduced levels of illuminance when circumstances permit, and also to encourage energy conservation.

6.31 In the telephone operators' room where computer-type terminals will be used, the lighting should be designed to avoid bright reflections on the screen and to aid legibility of the contents. Further guidance can be found in CIBSE Lighting Guide LG3.[17]

6.32 In the equipment room, the lighting fittings should be arranged in relation to the equipment cabinet layout to ensure that adequate illumination is available for maintenance purposes when the cabinet doors are open.

Socket-outlets and power connections

6.33 Sufficient 13 amp switched, shuttered socket-outlets, connected to ring or spur circuits should be provided for the use of all portable appliances. Activity Data sheets indicate specific locations for the outlets associated with individual activities; the installation of twin outlets should be considered where these activities occur in juxtaposition.

6.34 Domestic cleaning appliances with flexible leads nine metres long should be assumed and switched socket-outlet, should be provided to enable such machines to operate over the whole area of this accommodation.

6.35 Fixed appliances rated up to 13 amp should be permanently connected to doublepole switched spur boxes and fused as required. Appliances rated in excess of this load, or those requiring a three-phase supply, should be permanently connected to separate final circuits from fuse-boards and be independently switched.

6.36 Local switches or other means of isolation should be provided adjacent to plant and equipment to ensure the safety of operators and maintenance staff.

6.37 Heating appliances and automatically operated equipment should be provided with indicator lights to show when the equipment is energised. Such indicators should be incorporated either in the control panel of the apparatus, in the control switch, or in the socket outlet from which the apparatus derives its supply.

Emergency electrical supplies

6.38 Guidance concerning the provision of emergency electricity supplies is given in HTM 11[18] and the grade of standby lighting provision is shown on the Activity Data 'A' sheets. Safety lighting in accordance with HTM 11[18] and BS5266[19] should be provided on primary escape routes.

6.39 All socket-outlets and power supplies in this accommodation should be connected to essential supply circuits.

Electric clocks

6.40 Clocks should operate in conjunction with a master clock system. The locations are indicated on the Activity Data sheets.

INTERNAL DRAINAGE

6.41 The drainage required from the telephone operators' rest room and WC should be incorporated as part of the sub-system serving the adjoining accommodation.

6.42 Drainage is a "wet" service and, as such, should be excluded from the exchange equipment room if at all possible — see paragraph 4.13.

References

1. **National Health Service.** Telephone exchanges having more than 150 extensions. Model Engineering Specification C47. 1986. 46pp.
2. **Department of Health and Social Security.** Health services management — Noise control (Hospital Design Note 4). HMSO, 1966. 20pp.
3. **Department of Health and Social Security.** Health services management — Noise control (Hospital Design Note 4): amendments to Appendices II, IV, and VII. (HN(76)126). DHSS, 1976. 2pp. (In Wales WHN(77)1).
4. **Department of Health and Social Security.** Noise and vibration. (DHSS Engineering Data Sheet DH1) DHSS, 1977. 24pp.
5. **Health and Safety at Work etc Act 1970.** HMSO.
6. **Consumer Protection Act 1987.** HMSO.
7. **Department of Health and Social Security and Welsh Office.** FIRECODE: Fire precautions in new hospitals. (Health Technical Memorandum 81). DHSS, 1987.
8. **Department of Health and Social Security and Welsh Office.** FIRECODE: Fire alarm and detection systems. (Health Technical Memorandum 82). HMSO, 1987. (under review) 53pp.
9. **British Standards Institution.** BS 5839:1980. Fire detection and alarm systems in buildings; Part 1. Code of practice for installation and servicing. 32pp.
10. **Department of Health and Social Security and Welsh Office.** FIRECODE: General fire precautions. (Health Technical Memorandum 83). HMSO, 1982. 26pp.

11. **Institution of Electrical Engineers**. Regulations for electrical installations. 15th edition. IEE, 1981. 216pp. (Plus subsequent amendments.)

12. **Department of Health and Social Security and Welsh Office**. Electrical services: supply and distribution. (Health Technical Memorandum 7). HMSO, 1977. 48pp.

13. **Ministry of Health**. Abatement of electrical interference. (Hospital Technical Memorandum 14). HMSO, 1965. 26pp.

14. **British Standards Institution**. BS 5394:1983. Specification for radio interference limits and measurements for luminaires using tubular flourescent lamps and fitted with starters. 12pp.

15. **Chartered Institution of Building Services Engineers**. Lighting Guide: hospitals and health care buildings. Publication LG2, CIBSE. 1989. 77pp.

16. **British Standards Institution**. BS 4533: Luminaires. Part 101:1981. Specification for general requirements and tests.

17. **Chartered Institution of Building Services Engineers**. Lighting Guide: Areas for visual display terminals. Publication No LG3 CIBSE 1989. 32pp.

18. **Department of Health and Social Security and Welsh Office**. Emergency electrical services. (Hospital Technical Memorandum 11). HMSO, 1974. 37pp.

19. **British Standards Institution**. BS 5266 Part 1. Code of practice for emergency lighting of premises.

7 Cost Information

7.1 For all types of health buildings it is clearly of vital importance that building costs and revenue expenditure should be kept as low as possible consistent with acceptable standards. Within this general concept, HBNs provide a synopsis of accommodation for health buildings which the Department of Health, in conjunction with the NHS, recommends for the provision of a given service.

Works cost

7.2 To prepare an estimate of the works cost for a scheme, reference should be made to the Capricode Health Building Procedures Manual (Chapter 1, Stage 1, Annex 1c).

7.3 The works cost covers the building and engineering guidance set out in this HBN. In the costing of the functional units, it has been assumed that they will be incorporated into a whole hospital to form a complete department.

Functional Unit

7.4 The Functional Unit for this HBN is the telephone extension. The number required will determine the number of exchange equipment cabinets needed and this in turn will establish the appropriate scale of accommodation which has to be provided. (See paragraph 4.2.) Schedules of activity spaces and areas used for costing the building and engineering requirements are provided at the end of this Chapter.

Cost Allowances

7.5 The Cost Allowances are made up as follows:

a. the cost allowance for the building and engineering requirements. (Three sizes of accommodation are given);

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b. the cost allowance for the telephone equipment; (given in increments of 100, from 200 extensions to 1600 extensions). This includes preliminaries and contingencies associated with the purchase and installation of the exchange equipment and hand sets.

The Cost Allowances have been produced in this way so that more realistic costs are included in the building and engineering element for Builder's Work in Connection (BWIC), Profit and Attendance (P&A), and Preliminaries and Contingencies (P&C). These items would have been diproportionately high if they had been related to the high cost of telephone equipment as well. It is expected that telephone equipment will be purchased by a separate direct contract with the supplier. This will not attract costs for Main Building Contractor's overheads.

Dimensions and areas

7.6 In determining spatial requirements, the essential factor is not the total area provided but the critical dimensions, ie those dimensions critical to the efficient functioning of the activities which are to be carried out and to the layout of equipment. There are therefore no recommended areas associated with the schedules of activity spaces.

7.7 It is recognised that for development planning, and at the earliest stage of a departmental design, it may be convenient for designers to have data available which enables them to make an approximate assessment of room sizes involved. For this reason, the schedules of areas, prepared for the purpose of establishing the cost allowance, are included at the end of this chapter. It is emphasised that the areas published DO NOT represent recommended room sizes, maximum or minimum allowances, nor are they to be regarded in any way as specific individual entitlements.

Circulation

7.8 The nett areas in the Schedule of Activity Spaces have been increased by 10% to cater for circulation. This includes allowances for planning provision, partitions and an engineering zone along external walls for the distribution of engineering services for heat emitters and other terminal outlets. The Cost Allowances include for this extra space.

Engineering services

7.9 The following engineering services, as described in Chapter 6 and exemplified in Activity Data, are included in the Cost Allowances. Primary engineering services are assumed to be conveniently available in the adjoining accommodation.

a. ***Mechanical services***

(i) *Heating:*

Generally low pressure hot water heating with thermostatic control, except for the telephone equipment room;

(ii) *Ventilation:*

Mechanical supply, with cooling as required, and extract to telephone equipment room. Mechanical extract to WC. Mainly natural elsewhere.

(iii) *Hot and cold water services:*

Centrally supplied to service points; storage excluded.

b. ***Electrical services***

(i) *Lighting:*

General lighting as required by tasks. Fluorescent, safety and emergency luminaires as appropriate.

(ii) *Power:*

Power supplies to telephone equipment room. Socket outlets and other power outlets for fixed and portable equipment. Supplementary equipotential earth bonding connections. Functional earth for telephone equipment.

(iii) *Alarms etc:*

Wireways for alarm systems which may be located in telephone operators' room. Impulse clocks.

Telephone equipment

7.10 The following items are included in the Cost Allowances for the supply and installation of telephone equipment:

a. Equipment cabinets, complete with power and extension circuit boards to capacity selected;

b. Exchange lines circuit boards arranged for 20% (or minimum of 16 lines) Fall back;

c. Network termination point and test jack frame to suit capacity selected;

d. Battery and power supply/charger for four-hour stand by;

e. Operator consoles and interconnecting cables to equipment cabinets;

f. Telephone instruments for initial capacity, plus 5% (see paragraph 3.35);

g. Interface equipment for coupling of staff paging system;

h. Testing and acceptance of equipment by PTO.

7.11 The telephone internal cabling distribution within departments, including the terminating Line Jack Units, is not included in the cost allowances promulgated with this HBN. This aspect is now included in the respective Departmental Cost Allowances, as described in the relevant HBNs.

7.12 The telephone cabling distribution to buildings and between departments within buildings should be taken as an external works on-cost for the purposes of Capricode procedures. There are several other items necessary to complete a telephone system which, because of their extremely variable nature, are not included in the Cost Allowances for telephone equipment and should also be taken as an external on-cost for the purposes of Capricode procedures. These include:

a. connection charges levied by the PTO for exchange lines;

b. provision of private circuits, including any equipment for multi-channel working;

c. purchase of an existing telephone ICD from the PTO together with any upgrading necessary to satisfy the Pre-Connection Inspection and the provision of any associated "overlay" for the PTO's network services.

7.13 No Cost Allowance can be recommended for the optional additions of CILE and Directory Package. These features are also extremely variable in cost due to their dependence upon a particular manufacturer's detailed equipment and software configurations.

Schedule of Activity Spaces

Activity space	Number of Telephone equipment cabinets		
	1	2	3
	Sq.m.	Sq.m.	Sq.m.
Equipment room	16.0	20.0	25.0
Operators' room	10.0	25.0	40.0
Rest room	9.0	9.0	9.0
WC	4.0	4.0	4.0
Net total	39.0	58.0	78.0
Circulation etc	4.0	6.0	8.0
Total	43.0	64.0	86.0
Departmental total	45 Sq.m.	65 Sq.m.	85 Sq.m.

8 Activity Data

8.1 The term 'Activity Data' refers to an information system developed to help project and design teams by defining the users' needs more precisely. This information constitutes the Activity Data Base, which was issued to Regional Health Authorities in England and to the Health Departments in Scotland, Northern Ireland and Wales in 1989. It comprises three types of information sheet: Activity Space Data Sheets (known as 'A' sheets), their supporting Activity Data Sheets (known as 'B' sheets), and 'A' sheet component listings (known as 'D' sheets).

8.2 'A' sheets record in more detail than is described in this HBN each task or activity that is performed in a particular activity space (which may be a room, space or bay) together with details of the environmental conditions and the technical data necessary to enable the activities to be performed. Each 'A' sheet also contains a list of the titles and code numbers of the relevant 'B' sheets.

8.3 'B' sheets provide narrative text and graphics to scale relating to one activity. They show equipment fitted or supplied as part of the building, and the necessary engineering terminals. There are also "component 'B' sheets", which show a range of particular components rather than an activity.

8.4 'D' sheets provide information about the total quantities of components extracted from all the 'B' sheets selected for inclusion in an individual 'A' sheet.

8.5 Further information about the use and preparation of Activity Data can be found in the 'Guide to 'A' and 'B' Activity Data Sheets and their use in Health Building Schemes', which was issued to Health Authorities with EL(89) MB/19 (WHC(89)18 in Wales). Copies of the Guide are available from the Department's Estates Directorate, Branch ED6.2, Euston Tower, 286 Euston Road, London NW1 3DN.

8.6 Further Activity Data Sheets may be selected, or drawn up by project teams to their own requirements, for any services not described in the Note or included in the list. Members of project teams are advised to contact their Regional Activity Data Co-ordinator/ Welsh Office for information and advice about the selection of activity data, at an early planning stage. However, in order to ensure consistent and economic provision, variations from the 'A' sheets recommended for the spaces covered in this Note should be considered only where it has been decided that the function of a space will substantially differ from that described.

Activity Data applicable to this HBN

8.7 The 'A' sheets recommended for the activity spaces in this HBN are either new sheets, amended ones, or selected from existing sheets. Their code numbers and titles are set out below.

Activity Data 'A' Sheets

Activity space		'A' sheet Code No.	Para no. in HBN
Equipment room	1 cabinet	K0514	4.2
	2 cabinets	K0515	4.2
	3 cabinets	K0516	4.2
Operators' room	1 cabinet	K0503	4.14
	2 cabinets	K0504	4.14
	3 cabinets	K0505	4.14
Rest room		D0509	4.17
WC		V0907	4.18

Appendix 1 — Training of staff in use of Stored Program Control (SPC) Telephone Exchange facilities

Introduction

1. One of the features of Stored Program Control (SPC) Exchanges is the wide range of facilities which are available. Many of the facilities were formerly the prerogative of the operator rather than the extension user. The current generation of exchanges now transfers these facilities to the extension user.

2. This trend is likely to continue and should be encouraged, but in order to make it effective, the extension user must be fully aware of the facilities which are available and be trained in their use. A further benefit is that the extension user is less dependent on the operator and this can possibly reduce the operator's work load.

3. A consideration peculiar to hospitals is the number of staff likely to be involved in training, coupled with the difficulty of staff being made available for training. Generally, this presents a much greater problem than is usually encountered in a commercial organisation.

4. Within the terms of the equipment Contract, the contractor is usually made responsible for the training of staff involved, and the NHS Standard Specifications incorporate this obligation.

Users

5. Normally, the contractor is allocated a room to be used for training and, within the terms of the Contract, will provide a number of extensions to allow:

a. the facilities to be demonstrated;

b. the staff to obtain "hands on" experience.

One of these extensions is usually of the loudspeaking type in order to allow the tones to be demonstrated.

6. A detailed training programme is normally prepared in conjunction with the Hospital Administration allowing varying groups of staff to attend the demonstrations, the size of which may depend on the number to be trained and the accommodation available.

7. In larger hospitals, groups of up to 100 have to be trained and although not all are able to have "hands on" experience, they are made aware of the facilities. An Extension User Card is, of course, always available to remind users of the method of operation.

8. The training of extension users may be undertaken by using demonstration techniques as outlined above, which may include the use of video training films. Each extension user should receive a demonstration of all the facilities even if these may not be available at every extension.

Supervisory staff

9. This group would typically include an Administrator and the telephone supervisor and may require attendance at a special training course run by the contractor. This training should enable them to manage the exchange, to make supervisory changes to facilities and to continue to provide training for operators and extension users.

10. Normally, the cost of the course is included in the equipment Contract, but travel and subsistence may be an additional charge.

Operators

11. It is essential that all operating staff, including night shift staff, should be fully trained before the exchange is brought into service.

12. Normally, the exchange will be working, but not in service, at least one week before the "bring-into-service" (BIS) date, and the operators may be trained in this period. Alternatively, training may be undertaken at another location which has a similar exchange.

Timing

13. The training programme can be commenced before the BIS date, but experience has shown that while it may be more effective to train Supervisors and operators before this date, extension users can generally be trained after commissioning. However, special consideration may be appropriate for the early training of some key personnel, eg cardiac arrest team, night charge staff, and security staff.

14. The disadvantage in "pre-training" users is best shown in a large hospital where, due to the numbers involved, staff may well receive training some three weeks before the BIS date. The real advantage in training after the BIS date is that all of the staff involved can immediately begin to use the facilities of the newly-commissioned exchange.

15. There is no disadvantage if staff are using their extensions without being aware of the full facilities, as they can continue to operate the new equipment similarly to the previous exchange, although it is helpful if a short memorandum is circulated explaining the very basic features of making internal and external calls.

16. Appropriate arrangements will need to be devised to ensure that staff who start their employment subsequent to the BIS date and main training programme receive adequate instruction in the correct use of the telephone system.

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(not including detailed engineering references, which are given at the end of Chapter 6)

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